



Honorable Philip E. Coyle
Director, Operational Test and Evaluation

Presentation to DSSG-7
February 7, 2000



The Operational T&E Community is moving toward Testing for Learning:

- **Early involvement, especially early operational assessments**
- **Modeling and Simulation**
- **ACTDs**
- **DT + OT**
- **Experimentation, notably AWEs and Battle Labs**



Cradle To Grave Application



- **Combat development**
- **Engineering and manufacturing development**
- **Test and Evaluation**
- **Training**
- **Sustainment**

**Modeling
&
Simulation**





Myths



- Operational testers won't use M&S
- M&S is cheap
- Testing and M&S are opposite ends of a balance scale

**TRUTH IS: M&S and Testing are intertwined;
when they are not, neither is effective**



M&S Could Have Predicted This!

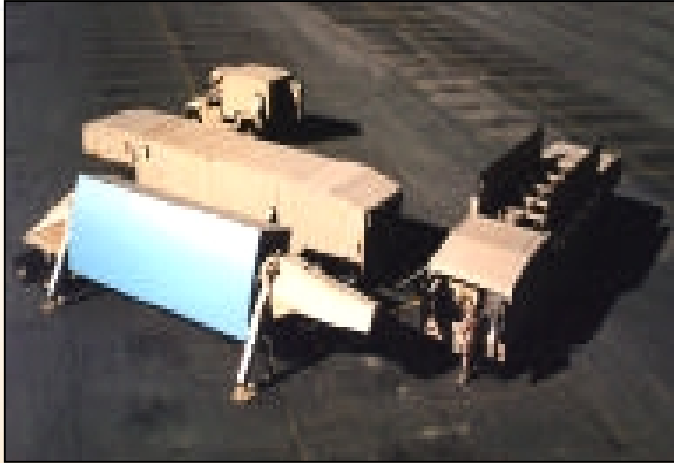


“Costly new vehicle found to roll over at intended speeds.”

**New York Newsday
May 1, 1998**



M&S Could Have Predicted This!



THAAD



M&S Could Have Predicted This!



Strategic Sealift Ship



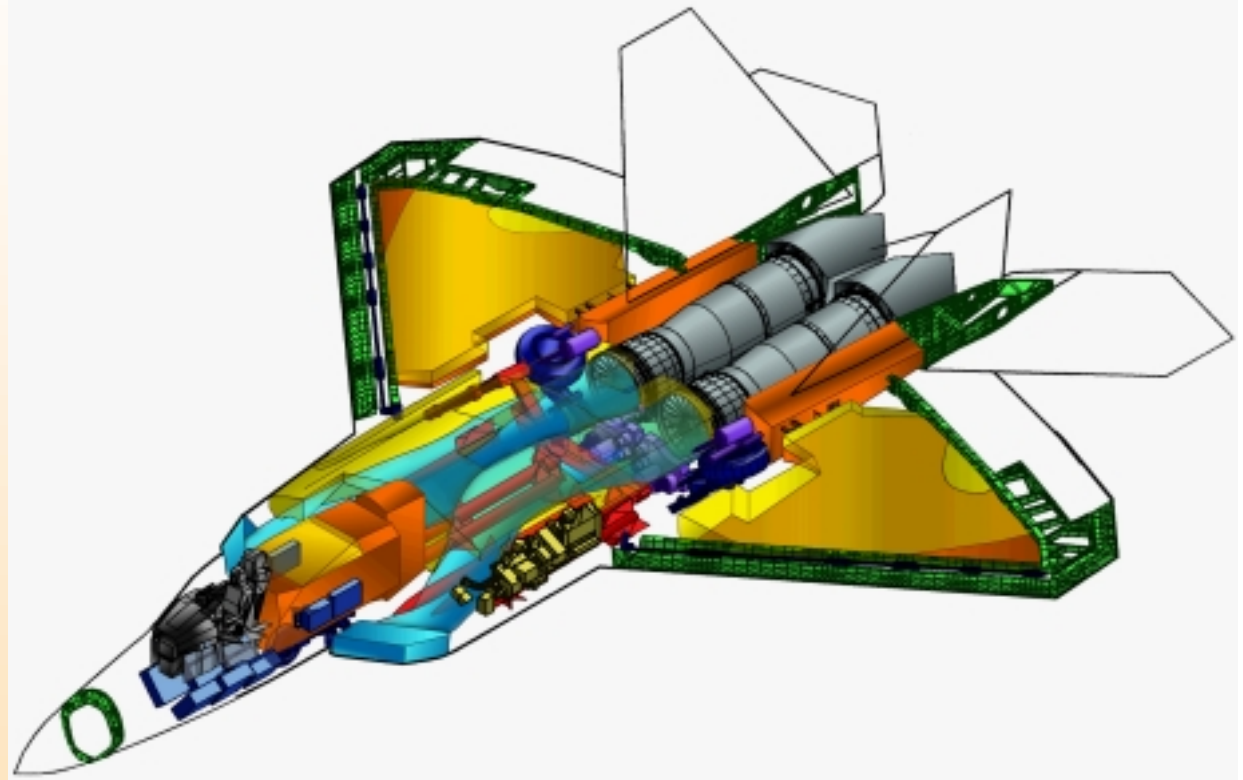
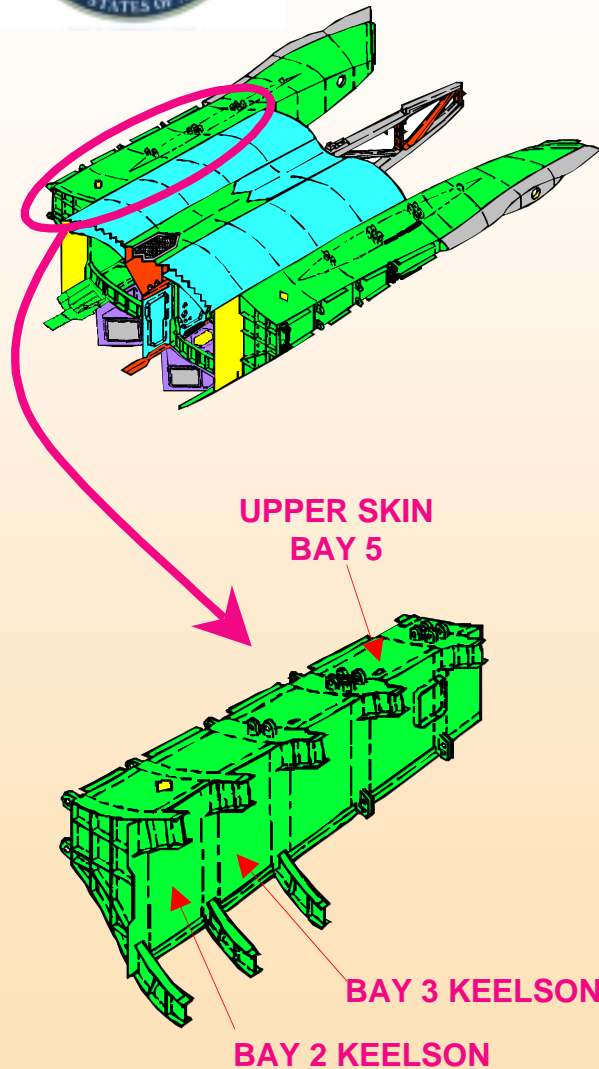
M&S Could Have Predicted This!



JSTARS CGS-HMMWV



M&S Did Predict This!



Forward Boom Buckling



The Case for Early Involvement: Cost to Fix Problems



Requirements
\$1



Design
\$10



Code
\$100

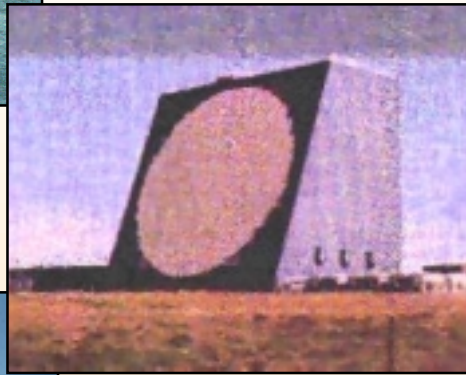


Test
\$1000

AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER



Effects of Poor Software



- Aegis cruiser towed back to port for software fixes
- COBRA DANE unsuitable software caused extended system shutdown
- First Iraqi F-117 strike: targeting computer required reboot while inbound to target
- Patriot missile target tracking off 678 meters; 28 killed & 98 injured





Ten Keys to Success (or how to avoid bad news)

- Get OTA testers involved early - before the MNS and keep them involved.
- Plan tests and M&S around “learning” decisions.
- Plan and budget for M&S from the outset.
- Do Early Operational Assessments every year.
- Test against an operationally realistic threat and budget for it -- and keep up with the changing threat.
- Side-by-side testing protects the PM.
- Talk to the User early and regularly.
- Look for opportunities to identify and correct problems early.
- Combine testing where appropriate.
- Don't bet your program on the test.
- Test the system as it will be used, OT and Live Fire.



Past 25 Years

Long History of Support

- Report to the President & SecDef on the Department of Defense by the Blue Ribbon Panel - July 1970.
- DOD OT&E Office established in 1972 reporting to DDR&E.
- DOT&E established in 1983 reporting to SecDef.
- Blue Ribbon Commission on Defense Management (Packard Commission) in 1986 - emphasized early OT&E.



Background



- DOT&E was created by Congress in 1983.
- Director is appointed by the President and confirmed by the Senate.
- The Director reports, by statute, go directly to the Secretary of Defense and Congress without intervening review or approval.
- Responsible for all operational test & evaluation and live fire test & evaluation within DOD.
- Responsibilities contained in Title 10, United States Code.



Congressional Objectives

- Independent oversight.
- Coordination of Military Services planning & execution of Operational Testing.
- Independent evaluation of the results of Operational Testing.
- Objective reporting of these results to decision makers in DOD and Congress.

“A fundamental congressional concern was that weapons were not being tested thoroughly or realistically and that complete and accurate information was not being disseminated.”

GAO R4port to Congress, “Weapons Testing,” dated Jul 88.

The background of the slide is a photograph of a military vehicle, likely an Abrams tank, moving through a desert environment. The vehicle is partially obscured by a large cloud of dust or sand kicked up by its movement, creating a sense of action and realism. The overall color palette is dominated by warm, earthy tones like tan, brown, and beige.

Weapons that Work

DOT&E

DOT&E will ensure that weapons systems are realistically and adequately tested and will provide complete and accurate evaluations of operational effectiveness, suitability, and survivability to the Secretary of Defense, other decision makers in DoD, and Congress. DOT&E will accomplish this by providing policy, test approval, and independent reports.



Title X, USC Section 139



- **“There is a Director of Operational Test and Evaluation in the Department of Defense, appointed from civilian life by the President, by and with the advice and consent of the Senate.”**
- **“Operational test and evaluation means --**
 - **(1) the field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for use in combat by typical military users; and**
 - **(2) the evaluation of the results of such test.”**



Title X, USC Section 139



■ “The Director shall--

- (1) prescribe, by authority of the Secretary of Defense, policies and procedures for the conduct of operational test and evaluation in the Department of Defense;
- (2) provide guidance to and consult with the Secretary of Defense and the Under Secretary of Defense for Acquisition and Technology and the Secretaries of the military departments in general and with respect to specific operational test and evaluation ...;
- (3) monitor and review all operational test and evaluation in the Department of Defense;
- (5) review and make recommendations to the Secretary of Defense on all budgetary and financial matters...;
- (6) monitor and review the live fire testing activities of the Department....”



Responsibilities

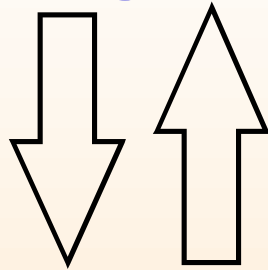


- Member of DAB & MAISRC.
- Report annually to Congress on Operational Test & Evaluation (OT&E) and Live Fire Test & Evaluation (LFT&E).
- Prescribe DOD OT&E and LFT&E policy.
- Provide guidance on all OT&E and LFT&E matters.
- Monitor & review all OT&E and LFT&E in DOD.
- Approve test plans for OT & LF oversight programs.
- Report on programs, before proceed beyond LRIP:
 - Adequacy of OT&E & LFT&E.
 - Operational effectiveness, suitability survivability & lethality.
 - By statute, to Congress and SecDef.

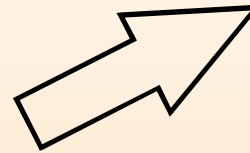


Interactions

SECDEF



DOT&E



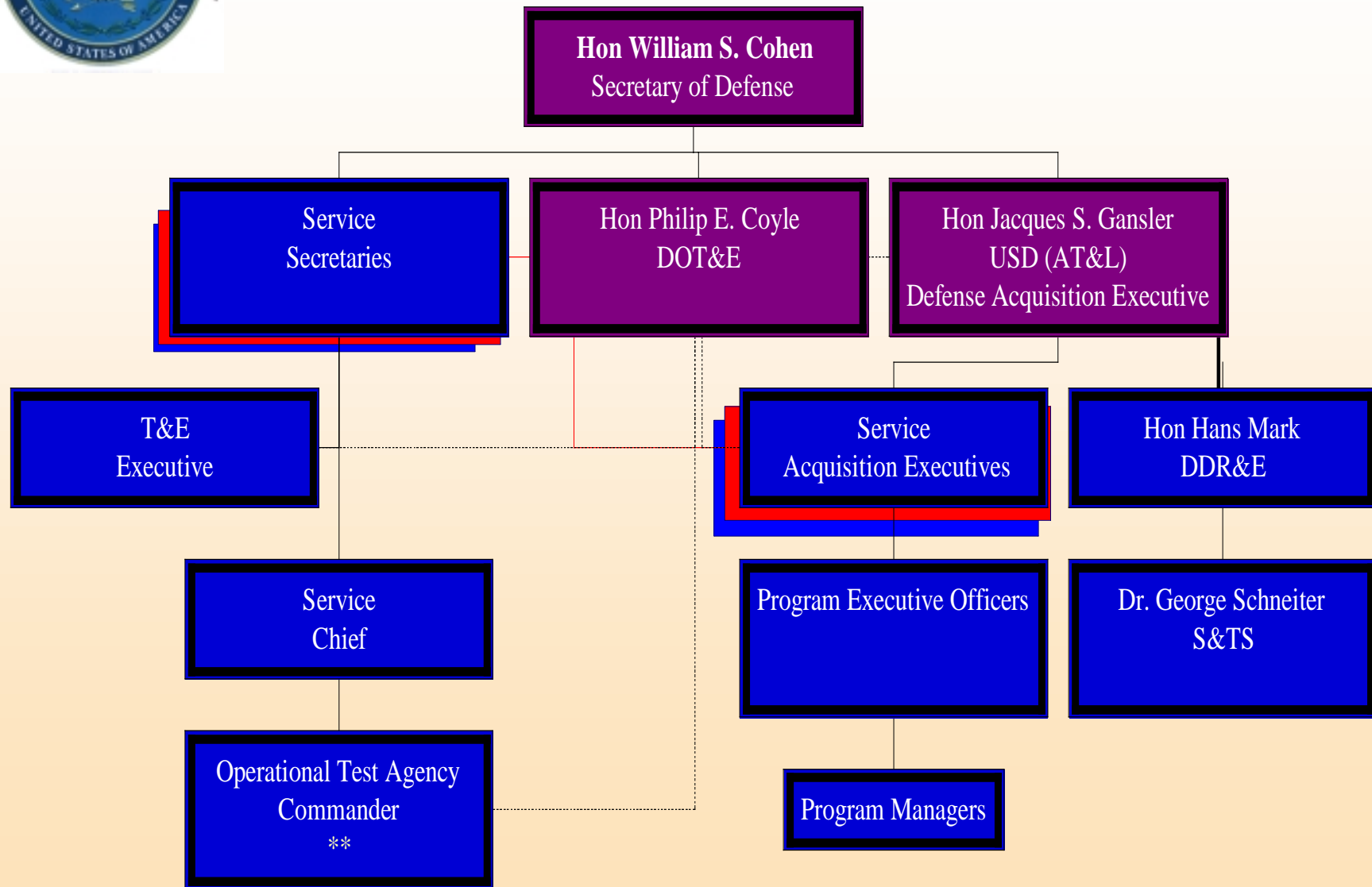
DOT&E Tools:

1. TEMP approval
2. TEP approval
3. B-LRIP reports
4. Live Fire Reports
5. DAES review
6. Annual Report
7. Director's Memo, Testimony, Speeches, Visits, etc
8. Communication with OTAs



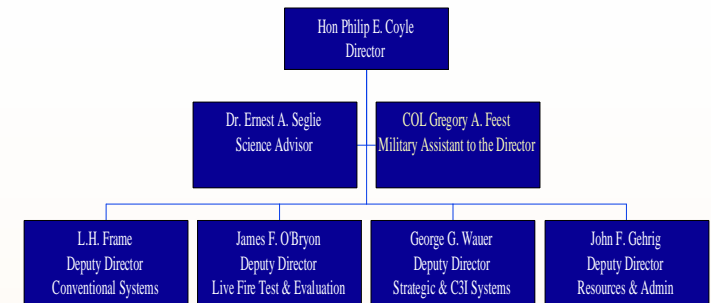


Organization





Why a program is placed under OT&E Oversight?



- Program exceeds or has the potential to exceed the dollar threshold for a major defense acquisition program (MDAP).
- Program has a close relationship or is key to a MDAP.
- Militarily significant change to an MDAP.
- Program requires joint or multi-service testing.
- Congress has directed DOT&E report as condition for production or progress.
- Congress or OSD has expressed a high level of interest.



Why a program is placed under Live Fire Oversight?



- Covered system is any vehicle, weapon platform, or conventional weapon system that includes features designed to provide some degree of protection to users in combat and is an ACAT I or II.
- May not proceed beyond low-rate initial production until realistic survivability or lethality T&E is complete and a report provided to Congress.
- Testing conducted early to influence design.
- Includes component tests through full-up, system-level tests.
- Includes systems and covered product improvements.



DOT&E Focus



- **Was the OT&E and / or LFT&E adequate?**
- **Is the system operationally effective?**
- **Is the system operationally suitable?**
- **Is the system survivable and lethal?**



Why do we test?





Operational Effectiveness

The overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, survivability, vulnerability, and threat.

- **Key point: Link operational effectiveness COIC to system mission accomplishment.**



Operational Suitability



The degree to which a system can be satisfactorily placed in field use, with consideration given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistics supportability, documentation, and training requirements.



Survivability



- **Survivability = Susceptibility.**
 - Vulnerability.
 - Reparability.
- **Survivability Testing.**
 - Testing for vulnerability of the system in combat by firing munitions likely to be encountered in combat at the system configured for combat.
 - Susceptibility to attack.
 - Combat performance.



Lethality

- **Lethality testing is required for a major munitions program, missile program, or covered PIP.**
- **Test for lethality by firing the munition or missile at appropriate targets configured for combat.**
- **“Configured for combat” means loaded or equipped with all dangerous materials (including all flammables and explosives) that would normally be on board in combat.**

“Testing is the conscience of acquisition.”

**Honorable William J. Perry
Secretary of Defense**



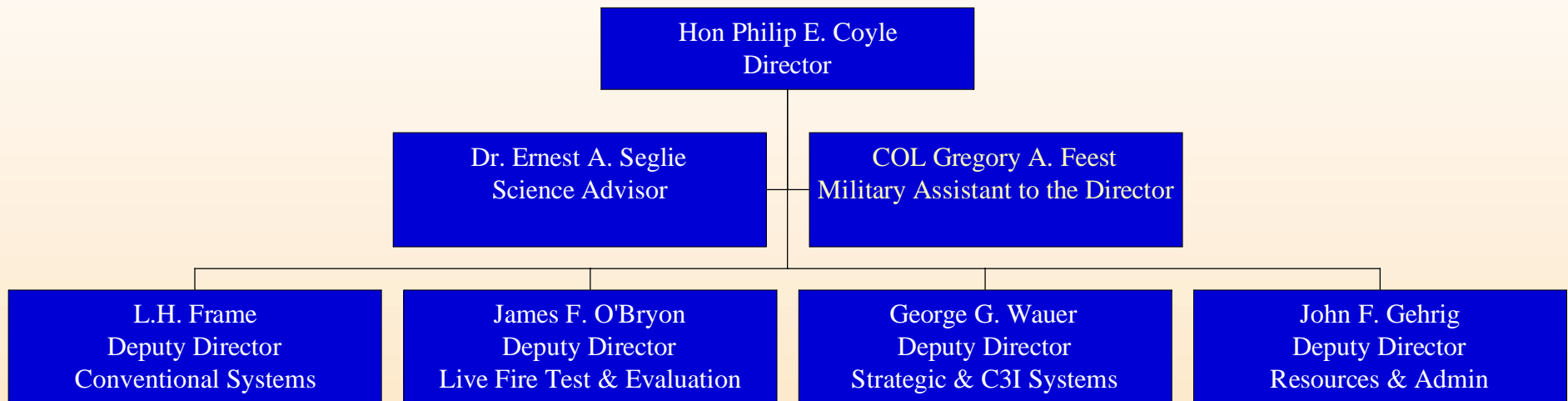


Secretary of Defense T&E Themes

- **Early Involvement.**
- **Use models and simulations effectively.**
- **Combine tests when possible (DT+OT) (OT+OT).**
- **Combine tests and training when possible.**
- **Do above for all programs, including ACTDs.**



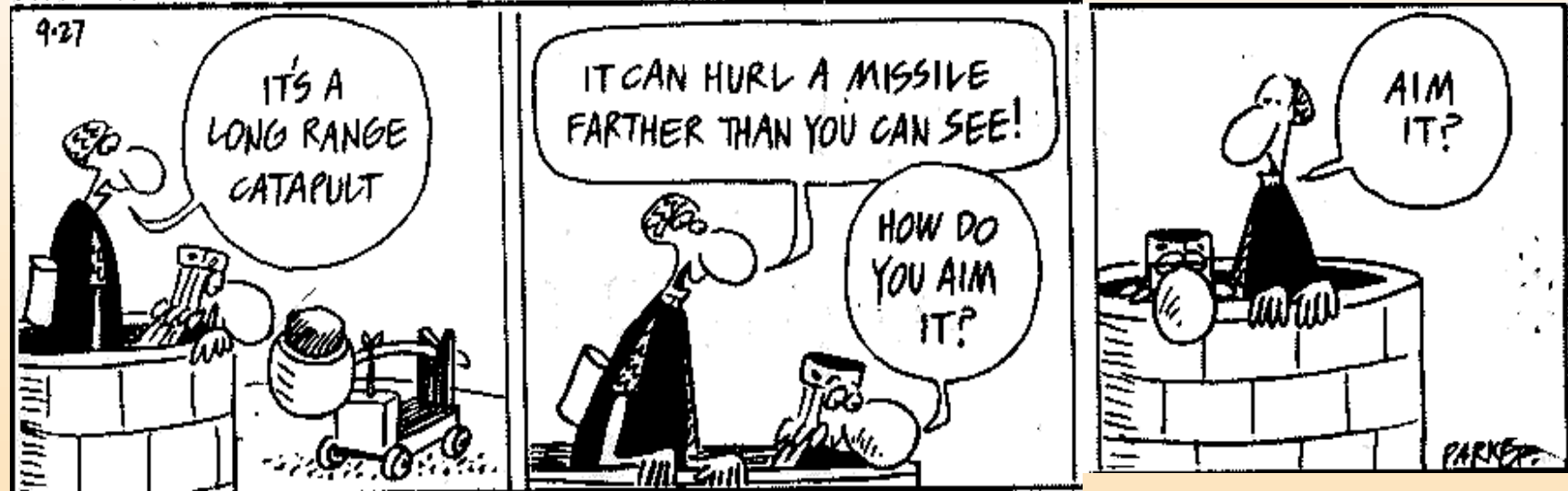
DOT&E Organization





Early Operational Insights Can Inform Design

THE WIZARD OF ID PARKER & HART





Testing for Learning in Military Acquisition Programs versus testing for learning in other areas of government:

NASA

DOE

NSF

NIH

Overall, the Department of Defense has been associated with the downsides of “Pass/Fail” testing more than the upside of testing for learning.